

WHAT IS CLAIMED IS:

1
2 1. A method of welding comprising:
3 positioning sealant between surfaces to be welded
4 together; and
5 welding at least portions of the surfaces together to
6 cure the sealant there between.

1 2. The invention of claim 1 wherein the welding further
2 comprises:
3 friction stir welding.

1 3. The invention of claims 1 or 2 wherein positioning the
2 sealant further comprises:
3 positioning a monomer between the first and second
4 surfaces to be welded.

1 4. The invention of claim 3 wherein positioning the monomer
2 further comprises:
3 partially curing the sealant before welding the first
4 and second surfaces together.

1 5. The invention of claim 4 wherein welding the surfaces
2 further comprises:
3 completing the curing of the sealant.

1 6. The invention of claim 3 wherein positioning the monomer
2 further comprises:
3 applying an adhesive monomer to the surfaces to be
4 welded.

1 7. The invention of claim 3 wherein positioning the monomer
2 further comprises:

3 partially curing the monomer before welding the surfaces
4 together.

1 8. The invention of claim 3 wherein positioning the monomer
2 further comprises:

3 applying an adhesive monomer to the surfaces to be

4 welded, and

5 partially curing the sealant before welding the surfaces
6 together.

1 9. The invention of claim 3 wherein welding the surfaces
2 together further comprises:

3 forming a sealant layer between at least portions of
4 surfaces being welded by polymerizing the monomer.

1 10. The invention of claim 9 wherein forming a sealant layer
2 further comprises:

3 polymerizing the monomer by welding the surfaces
4 together.

1 11. The invention of claim 3 further comprising:

2 applying heat to the first and second joint elements to
3 cure the sealant.

1 12. The invention of claim 11 wherein applying heat further
2 comprises:

3 applying laser energy to the surfaces to be welded to
4 cure the sealant.

1 13. The invention of claim 3 where the welding produces:

2 a lap joint or filleting.

1 14. The invention of claim 3 wherein positioning sealant
2 further comprises:

3 applying an elastomeric sealant.

1 15. The invention of claim 14 wherein positioning sealant
2 further comprises:

3 applying a fluoroelastomeric sealant.

1 16. A welded structure comprising:

2 a first member;

3 a second member welded to the first member; and

4 a fay surface sealant between the first and second

5 member cured by the welding.

1 17. The invention of claim 16 wherein the second member
2 further comprises:

3 a second member welded to the first member by friction
4 stir welding.

1 18. The invention of claims 16 or 17 wherein the fay surface
2 sealant comprises:

3 a monomer layer applied to the fay surfaces of the first
4 and second members before welding.

1 19. The invention of claim 18 wherein the fay surface
2 sealant comprises:

3 an adhesive monomer layer applied to the fay surfaces of
4 the first and second members before welding.

1 20. The invention of claim 18 wherein the fay surface
2 sealant comprises:
3 an adhesive monomer layer applied to the fay surfaces of
4 the first and second members and partially cured before
5 welding.

1 21. The invention of claim 20 wherein the fay surface
2 sealant comprises:
3 an adhesive monomer layer applied to the fay surfaces of
4 the first and second members before welding and completely
5 cured by welding.

1 22. The invention of claim 18 wherein the fay surface
2 sealant comprises:
3 an adhesive monomer layer between the fay surfaces of
4 the first and second members and at least partially cured by
5 the welding.

1 23. The invention of claim 22 wherein the fay surface
2 sealant comprises:
3 an adhesive monomer layer between the fay surfaces of
4 the first and second members and at least partially cured by
5 heat applied thereto in addition to heat applied thereto by
6 the welding.

1 24. The invention of claim 22 the fay surface sealant
2 comprises:
3 an adhesive monomer layer between the fay surfaces of
4 the first and second members and at least partially cured by
5 laser energy.

1 25. The invention of claim 18 comprising:

2 a lap joint or filleting associated with the fay surface
3 sealant.

1 26. The invention of claim 18 wherein the sealant further
2 comprises:

3 an elastomeric sealant.

1 27. The invention of claim 14 wherein positioning sealant

2 further comprises:

3 applying a fluoroelastomeric sealant.